KNOWLEDGE
AN ILLUSTRATED
MAGAZINE OF SCIENCE
PLAINLY WORDED—EXACTLY DESCRIBED

LONDON: FRIDAY, JANUARY 12, 1883.

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Science and Art Gossip.

READERS have reminded us that the opinion of a Darwin on the questions of a future existence ought to be balanced here "by that of men who have devoted a whole lifetime to theological inquiry." We do not know how much of a lifetime would suffice to deal with the doctrine of a future existence, or to determine the conditions under which it would be passed; but we accept the suggestion; and although the study of Bishop Wilberforce's "Life" rather conveys the idea that a considerable part of his time was given to matters a little outside theology, we assume that he was the sort of man to set science (and KNOWLEDGE) right. We quote, then, from him the statement that "the scholar, the man of refined and elegant mind, who nauseates everything coarse, mean, and vulgar, must" (if he die in disbelief of the Bishop's doctrines) "for ever dwell with beings on whose horrible passions no check or restraint can ever be placed;" while women of gentle breeding, of refined and modest tastes, but similarly incredulous, must "dwell for ever among the worst of men, with every spark of human feeling extinguished, without any law to moderate the fury of their desperate rage." (See "Eternal Punishment," by Presbyter Anglicanus, in Mr. Thomas Scott's series, published in 1864.) It would seem that only "the worst of men" will be able to indulge their tastes hereafter.

How severely, then, ought Darwin, and men like him, to be reprehended for saying aught that might tend to deprive mankind of these blissful expectations. And how wrong of them to speak of doubt in a matter on which such clear and precise information was obtained by one of the most eminent of those who "have given the best part of a lifetime to such studies."

WE have now balanced the dogmatic doubtings of a student of science with the humble utterances of one having authority. This done we close the subject, as one on which only the strong-worded references of certain papers to the views of the Newton of Biology had led us—almost forced us—to touch.

THE question of a future existence only belongs to science in such sort as Tylor and others have dealt with it, showing how widespread the belief is among all races of men, even (perhaps especially) the most uncivilised, and in how interesting a manner it is associated with the significance attached to dream-visions. In this aspect Mr. Clodd is likely enough, we imagine, to touch on the subject here, as he has already done in some of his most interesting chapters. But the theological question will not be again referred to in these columns, unless another Darwin should express his views—or his want of views—upon it. "In such a *then* we write a *never*."

IN the *Academy* for Dec. 23, the eminent Egyptologist, Miss Amelia B. Edwards, reviews the Editor's work on the Great Pyramid (a large portion of which appeared in these pages), accepting so much of what he has endeavoured to establish, that he would be hard to satisfy indeed if the review were not most pleasing to him. In certain points about which an Egyptologist can form a much more satisfactory opinion than the student of astronomy, she notes objections to matters of detail, which, however, do not in any sense affect the general theory.

BUT there is one point about which those uninitiated in Egyptian lore would like some information. Nearly all Egyptologists—perhaps all—consider that the Pyramids were tombs primarily, whatever other purpose they may have subserved. This is practically the same as saying that the care taken by the Egyptians about the dead body was independent of any circumstances belonging to life in this world. Now, the natural idea, when one hears of a people who paid great attention to burial, is that the body was carefully attended to in reference to a future life, in which case, burial arrangements, however elaborate, would relate to the body only as the living man had earned certain rights hereafter. If an Egyptian did not intend during his whole life to do certain things and to avoid others, to attend carefully to certain religious ceremonies (including certain astronomical observances), and so forth, he would be well assured that carefully hiding away his mummy under a mass of stonework would be altogether useless. On this view (and despite the authoritative statements of Lepsius, Bunsen, Mariette, and others, one can scarcely conceive any other), the tomb would only be of value in relation to this life, and the theory that a pyramid is only a tomb, instead of having the meaning Egyptologists assign to it, would imply that the building of the structure, and the observances connected therewith, were most intimately associated with the life-work of the future tenant.

WE give this week the first half of the summing-up of the singularly clear and complete evidence adduced by Miss Edwards with regard to the Oppressor of the Hebrews; the remainder will appear in our next number. There is a deeper and wider interest in her subject than those imagine who regard it as simply the discussion of a Bible question. To the historian and to the archæologist, to the sociologist and to the theologian, the subject of Egyptian relations with the people from whom a large portion of the prevalent religion has been derived, is alike interesting and important. Speaking of religious ideas, it may be said, with little exaggeration, that while a large part of the Christian religion is of Hebrew origin, a much larger portion is derived from Egypt. The teachings of the founder of the religion are much more nearly akin to those of Egyptian than to those of Jewish preceptors.

XUM

Speaking of the remarkable and most instructive Diary of the late Bishop Wilberforce, we referred to the name of Soapy Sam, by which he was widely known. This nickname has been seriously discussed in the *Times* and *Telegraph*, and while on the one hand it has been proved that the name was given by the young Wilberforces to their brother Samuel because he was always washing his hands, it has also been demonstrated that the initials of the words S. Oxon, Alfred Pott, carved on the wall of Cuddesdon College (which the Bishop helped to found), supplied the S.O.A.P. to Samuel. The last derivation is singularly ingenious, because the nickname was in use before a stone of Cuddesdon College had been laid.

Other matters connected with the Diary are being discussed with considerable interest—almost with warmth. The effects of the soap in this lively book are somewhat suggestive of those resulting when soft soap is well rubbed into the eyes. The Greville Memoirs (though they are instructive too) are, by comparison, like the gentle utterances of an æsthetic curate.

In Farrar's "Life of Christ," Vol. I., p. 31, we read as follows:—"On Dec. 17, 1603, there occurred a conjunction of the two largest superior planets, Saturn and Jupiter, in the zodiacal sign of the Fishes, in the watery trigon (Cancer, Scorpio, Pisces). In the following spring they were joined in the fiery trigon (Aries, Leo, Sagitarius) by Mars; and in September, 1604, there appeared in the foot of Ophiuchus, and between Mars and Saturn, a new star of the first magnitude, which," &c., &c. . . . "Now there is a conjunction of Jupiter and Saturn in the same trigon about every twenty years, but in every 200 years they pass into another trigon, and are not conjoined in the same trigon again till a lapse of 794 years, 4 months, and 12 days. By calculating backwards, Kepler discovered that the same conjunction of Jupiter and Saturn in Pisces had happened no less than three times in the year A.U.C. 147, and that the planet Mars had joined them in the spring of 148, and the general fact that there was such a combination at this period has been verified by a number of independent investigators, and does not seem to admit of denial, and however we may apply the fact, it is certainly an interesting one. For such a conjunction would at once have been interpreted by the Chaldean observers as indicating the approach of some memorable event; and since it occurred in the constellation Pisces, which was supposed by astrologers to be immediately connected with the fortunes of Judæa, it would naturally turn their thoughts in that direction." Does Canon Farrar, we wonder, consider astrology true or false?

The French Minister of Public Instruction offers a prize of £2,000 for the best industrial application of electricity, open to all the world. Claims are to be sent in by June 30 next.

A valued correspondent (W. E. M.) asks us to invite Mr. Grant Allen to defend his spelling "misletoe." The Anglo-Saxon was "misteltan," we think; but we are away from all books of reference. W. E. M. quotes a number of authorities in favour of "mistletoe" and "misteltoe." Can any one tell us about the German and Danish "mistel"?

A Butterfly in Winter.—Mr. R. W. Smith writes from The Hollies, St. Anne's-hill, Chertsey, Jan. 2:—"A perfect specimen of the sulphur butterfly was observed this day on St. Anne's-hill." Mr. William Callow writes from The Firs, Great Missenden, Bucks:—"On Saturday, Dec. 30, I heard the song-thrush, and snowdrops have for some time been visible in my garden."

The *British Journal of Photography*, and several correspondents, point out a mistake in the article on Luminous Paint. The lecturer on that substance at the Crystal Palace seems unaware of the fact that, so far from producing no impression on the most sensitive photographic plate, it is used as a photographic test.

It is singular how little the true use of statistics is understood even by those who claim to be statisticians. In fact, strangely enough, as we often find among professed grammarians the worst samples of language, among professed logicians (as Macaulay long since pointed out), the shallowest reasoning, so do we find often among professed statisticians the worst samples of the wrong use of statistics. Sir Francis D. Bell quotes, as evidence of the vitality of people in New Zealand, the birth-rates and death-rates there as compared with European countries. But, as a writer in the *Times* points out, in dealing with the birth rates and death-rates of a country receiving immigrants and having a population largely formed of recent immigrants, it does not suffice to exclude from the increase the actual immigrants. We have to omit from the amount the births and deaths among immigrants, and also the artificial nature of the population of a new country, where there is never the normal admixture of old and middle-aged.

We note with pleasure that Mr. D'Oyley Carte, after being long troubled by the difficulty with which, at this season of the year, ingress is obtained into those parts of theatres where seats are unreserved, has found a perfect remedy in inducing those waiting to form a double line, as they do on the Continent and in America. We owe him thanks, as the Romans did to Fabius, that he did not despair of our civilisation, giving the British public credit for being willing to do what other nations will do for their own convenience. If now the managers of other theatres will have confidence that what can be done at the Savoy can be done elsewhere, the public will be saved much trouble and some danger.

We are glad to be able to announce that Mr. York, of Lancaster-road, Notting-hill, is about to issue a series of biological slides adapted for the illustration, by means of the lantern, of both popular and scientific lectures. There has long been a felt want of such a series of slides. Whilst there has been no lack of slides of an astronomical and physical kind, no accurate series of slides dealing with zoology or botany have been prepared. Hence it is hoped that the new series will supply a decided want, and that, as such, they will be largely patronised by science-lecturers. We understand that the editing of the slides has been undertaken by Mr. W. L. Carpenter, Dr. Andrew Wilson, and others, and the names of these gentlemen should alone be a guarantee for the effective selection of the subjects, and for the judicious compilation of the accompanying handbooks.

A magnificent and most kindly audience greeted Mr. Proctor at Leicester, where the Gilchrist Course of Six Lectures on Science was opened on Monday last. More than 1,500 were present in the Temperance Hall, and hundreds were turned away. The editor of Knowledge wishes to tell the people of Leicester that he was much moved by the warmth of their greeting after the three years that have passed since he last visited them.

XUM

THE BIRTH AND GROWTH OF MYTH.

By EDWARD CLODD.

THE application of the scientific method to the study of man has given a wider meaning to the word "myth" than that commonly found in the dictionaries. These explain it as fable, as designedly fictitious, whether for amusement only, or to point a moral. The larger meaning which it holds to-day includes much more than this—to wit, the whole area of intellectual products which lie beyond the historic horizon and overlap it, effacing on nearer view the lines of separation. For the myth, as fable only, has no place for the crude fancies and grotesque imaginings of barbarous races of the present day, and of races at low levels of culture in the remote past. And so long as it was looked upon as the vagrant of fancy, with no serious meaning at the heart of it, and as corresponding to no yearning of man after the truth of things, sober treatment of it was impossible. But now that it, with its prolific offspring, legend and tradition, is seen to be a necessary travailing through which the mind of man passed in its slow progress towards certitude, the study and comparison of its manifold, yet, at the centre, allied forms, and of the conditions out of which they arose, takes rank among the serious inquiries of our time.

Not that the inquiry is a new one. Five hundred years before Christ, *i.e.*, in the days of Euripides, the Greeks had identified the gods of their Olympus with the sun and sky, although Anaxagoras was sentenced to death and afterwards banished for calling the moon a lump of lifeless matter, and in succeeding times myths were either emptied of their meaning or exalted to historic rank. In the hands of Christian apologists, from the ages of the Fathers to the present day "heathen" mythologies have been cited as witnesses to the corruptions of the faith, and, under the solvent of blundering etymologies, have been made to yield traces of a primitive revelation and of the doctrine of a Trinity! But if the inquiry is not a new one, the method of its prosecution is—a method justified by its works. Because, for the assigning of its due place in the order of man's mental and spiritual development to myth, there is needed that knowledge concerning his origin, concerning the conditions out of which he has emerged, and concerning the mythologies of lower races and their survival in unsuspected forms in the higher races, which was not only beyond the reach, but the conception also, of men until this century.

Except, therefore, as curiosities of literature, we may dismiss the Lemprière of our school-days, and with him "Casaubon"-Bryant and his key to all the mythologies—a key that fits no lock; with him, too, in all respect be it added, Mr. Gladstone, with his visions of the Messiah in Apollo, and of the Logos in Athêné.

After this short preface, we may start with the brief and plain statement, to be justified by what follows, that the birthplace of myth is in the endeavour of primitive man to interpret the meaning of his surroundings. By primitive man, I do not, of course, mean the nameless savage of the old Stone Age, who, if he had brains and leisure enough to make guesses about things, has left us no witness of the fact. His relics, and those of his successors to a period which is but as yesterday in the history of our kind, are material only, and not until we possess the symbols of man's thought, whether in language or rude picture, do we get an inkling of the meaning which the universe had for him, in the detail of his pitiless daily life, in the shapes and motions of surrounding objects, and in the majesty of the heavens above him. Even then the thought is more or less crystallised, and if we would watch it in the fluent form, we must have keen eye for the like process going on among savages yet untouched by the Time-Spirit, although higher in the scale than the Papuans and hill tribes of the Vindhya. For we cannot so far lull our faculty of thought as to realise the mental vacuity of the savage, but we may, from survivals nowadays, lead up to reasonable guesses of savage ways of looking at things in bygone ages, and the more so when we can detect relics of these among the ignorant and superstitious of modern times.

What meaning, then, had primitive man's surroundings to him when eye and ear could be diverted from prior claims of the body, and he could repose from watching for his prey and from listening to the approach of wild beast or enemy? He had the advantage, from greater demand for their exercise, in keener senses of sight, hearing, smell, and touch than we enjoy; nor did he fail to take in facts in plenty. Only there was this vital defect and difference, that in his brain every fact was pigeon-holed, charged with its own narrow meaning only, as in small minds among ourselves we find place given to inane, peddling detail, and no advance made to general and wide conception of things. In sharpest contrast to the poet's utterance—

> "Nothing is this world is single,
> All things by a law divine
> In each other's being mingle,"

every fact is unrelated to every other fact, and, therefore, interpreted wrongly.

Man, in his first outlook upon Nature, was altogether ignorant of the character of the forces by which he was environed; ignorant of that unvarying relation between effect and cause which it needed the experience of ages and the generalisations therefrom to apprehend, and to express as "laws of nature." He had not even the intellectual resource of later times in inventing miracle to explain where the necessary relation between events seemed broken or absent.

His first attitude was that of wonder, mingled with fear—fear as instinctive as the dread of the brute for him. The sole measure of things was himself; consequently, everything that moved or that had power of movement, did so because it was alive. A personal life and will was attributed to sun, moon, clouds, river, waterfall, ocean and tree, and the varying phenomena of the sky at dawn or noonday, at grey eve or black-clouded night, were the manifestation of the controlling life that dwelt in all. In a thousand different forms this conception was expressed. The thunder was the roar of a mighty beast; the lightning a serpent darting at its prey, an angry eye flashing, the storm demon's outshot forked tongue; the rainbow a thirsty monster; the waterspout a long-tailed dragon. This was not a pretty or powerful conceit, not imagery, but an explanation. The men who thus spoke of these phenomena meant precisely what they said. What does the savage know about heat, light, sound, electricity, and the other modes of motion through which the Proteus-force beyond our ken is manifest? How many persons who have enjoyed a "liberal" education can give correct answers, if asked off-hand, explaining how glaciers are born of the sunshine, and why two sounds, travelling in opposite directions at equal velocities, "interfere" and cause silence? I have been surprised at the number of young men, hailing from schools of renown, who have given me the most ludicrous replies when asked the cause of day and night and the distance of the earth from the sun.

That the comparison between things inanimate and

animate arising from superficial analogies is inborn in the savage, is illustrated all the world over. The North American Indians prefer a hook that has caught a big fish to the handful of hooks that have never been tried, and they never lay two nets together, lest they should be jealous of each other. The Bushmen thought that the traveller Chapman's big waggon was the mother of his smaller ones; and the natives of Tahiti sowed in the ground some iron nails given them by Captain Cook, expecting to obtain young ones. When that ill-fated discoverer's ship was sighted by the New Zealanders, they thought it was a whale with wings. The king of the Coussa Kaffirs, having broken off a piece of the anchor of a stranded ship, soon afterwards died, upon which all the Kaffirs made a point of saluting the anchor very respectfully whenever they went near it, regarding it as a vindictive being. But, perhaps, one of the most striking and amusing illustrations is that quoted by Sir John Lubbock from the "Smithsonian Reports," concerning an Indian who had been sent by a missionary to a colleague with four loaves of bread, accompanied by a letter stating their number. The Indian ate some of the bread, and his theft was, of course, found out. He was sent on a second errand with a similar batch of bread and a letter, and repeated the theft, but took the precaution to hide the letter under a stone while he was eating the loaves, so that it might not see him!

As the individual is a type of the race, so in the child's nature we find analogy of the mental attitude of the savage ready to hand. To the child everything is alive. With what timidity and wonder he first touches a watch, with its moving hands and clicking works; with what genuine anger he beats the door against which he has knocked his head, whips the rocking-horse that has flung him, then kisses and strokes it the next moment in token of forgiveness and affection. Even among civilised adults, as Mr. Grote remarks, "the force of momentary passion will often suffice to supersede the acquired habit, and an intelligent man may be impelled in a moment of agonising pain to kick or beat the lifeless object from which he has suffered." The mental condition which causes the wild native of Brazil to bite the stone he stumbled over, may, as Dr. Tylor has pointed out in his invaluable work on "Primitive Culture," be traced along the course of history, not merely in impulsive habit, but in formally enacted law. If among barbarous peoples we find, for example, the relatives of a man killed by a fall from a tree taking their revenge by cutting the tree down and scattering it in chips, we find a continuity of idea in the action of the court of justice held at the Prytaneum in Athens to try any inanimate object, such as an axe, or a piece of wood, or stone, which had caused the death of any one without proved human agency, and which, if condemned, was cast in solemn form beyond the border. "The spirit of this remarkable procedure reappears in the old English law, repealed only in the present reign, whereby not only a beast that kills a man, but a cart-wheel that runs over him, or a tree that falls on him and kills him, is deodand, or given to God, *i.e.*, forfeited and sold for the poor." Among ancient legal proceedings in France we read of animals condemned to the gallows for the crime of murder, and of swarms of caterpillars which infected certain districts being admonished to take themselves off within a given number of days on pain of being declared accursed and excommunicated. When the New Zealander swallows his dead enemy's eye that he may see further, or gives his child pebbles to make it stony and pitiless of heart; when the Abipone eats tiger's flesh to increase his courage, such confusion in the existence of transferable qualities as these acts imply, has its survivals in the old wives' notion that the eye-bright flower, which resembles the eye, is good for diseases of that organ, in the medical remedy for curing a sword-wound by nursing the weapon that caused it, and in the old adage, "take a hair of the dog that bit you"—as the Scandinavian Edda says, "Dogs' hairs heal dogs' bites."

A NATURALIST'S YEAR.

By Grant Allen.

IV.—WINTER HELIOTROPE.

THERE are few flowers out in the garden now, except two or three of the very hardiest species; but still our English year is never quite destitute of blossoms, and we have with us, even at this, its darkest moment, the Christmas roses, the last lingering chrysanthemums, and the beautiful purple winter heliotrope. Here is a sprig of that sweet-scented December plant, belonging to a bit which has run wild from the garden into the shadow of the wood on the southerly hillside. Winter heliotrope is not an English, or even a fully naturalised, flower, but it grows readily in sheltered situations in the south, and it often establishes itself for a time, by means of its long underground runners, near places where it has once been planted. Though an alien on our shores, however, it very closely resembles our own British butterbur or purple coltsfoot, from which it chiefly differs in its delicious perfume, in its more solitary flowers, and in its singular habit of blossoming during the very coldest months of winter.

By family, our heliotrope is a composite, one of the same great tribe as the daisies, the sunflowers, the thistles, and the dandelions. Perhaps, too, I ought to add that it is in no way related to the real heliotropes, which it resembles only in name and in the peculiar nature of its scent; for the real heliotropes are borage-worts by family, closely related to our own familiar blue forget-me-nots. But to tell you that a flower is a composite is not telling you very much; for there are many thousand species of composites in the world, all agreeing in their main structural features, but all differing infinitely in shape, colour, habit, and general aspect. That is to say, in other words, the composite family is a very successful one, which has not only held its own against allcomers, but has also split up into numberless minor branches, all competing against one another, and all adding certain special advantages of their own to the common advantages possessed by the entire race. These common advantages most people know well in the little English daisy, which, as we have all observed, has its flowers crowded into a single compact head, and surrounded by a group of bracts or involucre, which protect its united bells in the same way as the calyx of most other species protects the single blossoms.

Amongst the infinity of separate forms, however, into which the family of composites has split up, there are some eight or ten great groups in which relationship can be pretty easily traced; and these again fall into three rough and larger groups, whose characteristics can be readily noted, even by an unbotanical eye. The first is that of the thistles, in which all the florets of each head alike are similar and bell-shaped; the second is that of the daisies, in most of which the inner florets of each head are bell-shaped, while the outer ones are flattened out into large and conspicuous rays; the third is that of the dandelions, in which all the florets alike, central or external, have been flattened out into rays like the outer florets of the daisy. Clearly, in general genealogical arrangement, the three

groups succeed one another in the order here adopted; for the most primitive group is that in which all the florets still remain as bells, like those of their non-composite allies; the next in course is that in which the outer florets alone have become flattened; and the last, or most developed, is that in which the flattening has extended to all the florets alike.

Now to which of these does winter heliotrope belong? If you pick one of these heads in the wood here, you would say at once to the first, obviously. And I need hardly add that you would be wrong, as one always is with first impressions. This particular winter, heliotrope is a male plant (I will explain what I mean by that by-and-by); and it really has all its flowers tubular, just like those of the thistles. There are no female flowers anywhere about, however, for the whole colony is male alike; if there were, you would soon discover your mistake. The fact is, winter heliotrope is a composite, which has passed through the daisy stage, instead of never having reached it, and has now got out again on the other side, looking very much like a thistle that has never been through the course at all. A glance at the minor family relationships of the heliotrope will show you how it is that we know this.

The sub-tribe of composites, to which the winter heliotrope and its allies belong is that of the Senecionidæ, or groundsels. Of these, our common yellow English ragwort, found everywhere by roadsides during the autumn months, may be taken as a good typical specimen. It has numerous tubular or bell-shaped central florets, surrounded by several long, narrow spreading rays, like those of the daisy, only bright golden instead of pinky white. Occasionally, however, even in the ragwort itself, these outer rays are deficient; while in its close ally, the wood senecio, they are always very small and rolled back inconspicuously, and are very often wanting; and in that still more degenerate type, the little groundsel, which we give to canary birds, they have disappeared altogether. Now, the winter heliotrope has diverged from the central ragwort group in a somewhat different direction. The germs of Senecionidæ to which it belongs is that of the coltsfoots, called in technical language *Tussilago*. All these coltsfoots, though they vary so much in their flowers as to have been split up by systematic botanists into two or more distinct genera, are yet almost identical in their foliage, which sufficiently proves the reality of their close relationship. In all, the leaves are large, broad, and deeply heart-shaped; and they spring for the most part direct from the perennial rootstock, instead of growing on the same stem as the blossoms. The flowering stems issue from separate buds on the creeping stock, and rise as tall scapes, with no leaves except a few small clasping scales. In these particulars the different species so nearly resemble one another that it is easy to confuse them together when they are not in flower; but in blossom they differ so greatly that it is only by their intermediate gradation that you can trace their relationship to the central ragwort type at all.

The ordinary wild yellow coltsfoot (*Tussilago Farfara*) which grows so abundantly on railway embankments in early spring, has tall, fluffy, flower-heads, remarkably pretty, and consisting each of two kinds of florets. The outer florets are very numerous, long, and extremely narrow; and they are all strictly female, that is to say they have a pistil, style, and ovary, but no stamens or pollen-sacs. The inner florets are tubular, and they possess five anthers each. Here we have the first beginning of such a differentiation of sexes as we find fully carried out in the purple coltsfoots. These, however, including our English butterbur and the winter heliotrope, have gone a great deal further in their development than their yellow ally; for here the two kinds of florets are almost entirely separated on distinct plants. The male plants have a loose bunch of small purple heads, and all their florets are tubular, male and barren, with stamens alone and no pistil. To be sure, they have in their centre what seems to be an ovary, but if you cut open this false pistil with a sharp knife, and examine it with a pocket lens, you will see that it contains no ovule, and can, consequently, never ripen any seed. It remains there merely as a speaking witness of what the plant used once to be. In the female plants, on the other hand, the heads are closer and thicker, and every head consists of nothing but very narrow thread-like florets, each containing a perfect pistil, with ovary, style, and seed, but without any stamens. Thus, for purposes of safer cross-fertilisation, the sexes have become almost entirely distinct, and have taken almost universally to growing upon separate plants.

I say "almost," because the change has not yet been quite fully carried out. See, here is one of the male flower-heads on my winter heliotrope, which appears at first just like the others; but when you look closer, you can see that there are five or six stray female florets at the outside, as last representatives of the original ray. So on the female plants, you will often find a single head with three or four stray tubular male florets, lost in the midst of a great fluff of thread-like females. In short, while the one set have been reduced almost, but not quite altogether, to nothing but disk-florets, the other set have been reduced almost, but not quite altogether, to nothing but ray-florets. It is usually so in nature. Though the clues are often all but lost, a few generally remain just in sufficient number to help us in reconstructing the lost pedigree; and so the yellow coltsfoot bridges over for us the distance between the ragwort and the butterbur, while the abnormal or bi-sexual flower-heads of the winter heliotrope bridge over the distance to the perfectly unisexual individuals on the thoroughly male or female plants.

WAS RAMESES II. THE PHARAOH OF THE OPPRESSION?

By AMELIA B. EDWARDS.

XV.—TEL-EL-MASKHUTA *VERSUS* THE "RAAMSES" OF THE BIBLE (EXAMINATION OF THE EVIDENCE).

I MUST now entreat those who have had patience to accompany me thus far in a minute, and, perhaps, a somewhat tedious, inquiry, to join with me in a final examination of the evidence which connects Tel-el-Maskhuta with the "Raamses" of the Bible, and both with Rameses II.

To begin with, Tel-el-Maskhuta is distinctly in the Land of Goshen. However uncertain the boundaries of that district may be, Wady Tûmilat was as much a part of the province as the city of Goshen itself. That is a point upon which there is no room for doubt, and which has never been doubted. Whether the town, fortress, *Bekhen*, or "treasure-city," the remains of which lie buried under the mound, was, or was not, an entirely new place founded by Rameses II., and containing a temple dedicated to himself in the character of its local divinity, is the question which now remains to be answered. We must first see whether this *Bekhen* corresponds with the descriptions of Pa-Rameses as derived from the monuments.

1. *Pa-Rameses was a frontier fortress.* The inscription of Ptah-Tatunen at Aboo-Simbel describes it as "a great

fortress to fortify the border of the land."* The Anastasi papyri II. and IV.† describe it as a *Bekhen* stationed "between Zahi (Palestine) and Egypt;" another papyrus in the same collection, written by the scribe Amen-em-apt, speaks of it as "the beautiful outpost" on "the frontier of the land of the foreigner, the boundary of Egypt.‡

The *Bekhen* of Tel-el-Maskhuta was all that is here described—a strong place upon the Palestine frontier, guarding a valley, which was one of the most important gates of the eastward boundary of Egypt.

2. *Pa-Rameses was Built by Rameses II.*—"Thou hast built a great residence to fortify the border of the land, the city of Rameses," says the inscription of Ptah-Tatunen. "His Majesty has built himself a *Bekhen*," says the Anastasi papyri. The Bible tells the same tale, though set to a different key:—"And they built *for Pharaoh* treasure-cities, Pithom and Raamses"; *new* cities, these, and not mere additions to cities of more ancient date.‖

Before it can be positively proved that these ruins contain no remains of a date earlier than the reign of Rameses II., it will be necessary to cut a trench through the mound of Maskhuta. But, thus far, the evidence, both direct and indirect, points to Rameses II. The huge bricks found here by Dr. Lepsius are stamped with this king's royal oval; and no bricks stamped with the oval of any of his predecessors have yet been discovered on the spot. They are made from the clay of the neighbouring clay-beds, mixed with chopped straw, and pressed in a wooden mould. The presence of the chopped straw is interesting; because chopped straw did not invariably enter into the composition of ancient Egyptian bricks, and because the Bible especially points out that chopped straw did enter into the composition of those particular bricks of which the treasure-cities Pithom and Raamses were built. The Egyptians, indeed, made excellent bricks of mere sun-dried clay; bricks as solid and as durable as those which they mixed with straw, beanhaulm, and stubble. At Thebes, many of the crude brick remains are built with bricks of unmixed clay; and only the other day, at Haybee, near Feshoon, Mr. Lawrence Oliphant, on examining the massive fortifications which surround the ancient city of Isi-em-Kheb, found them to be constructed of bricks in which there is no binding substance whatever. The old Egyptian name for a sunburnt brick is in use to this day. The "*teb*" of the hieroglyph is the "*tôbi*" of the Coptic, and the "*toob*" or "*tob*" of the modern Arabic.

The evidence of the sculptured monolith and sphinxes, already described,§ can, of course, be taken for only what it is worth. It proves that Rameses II. embellished the place; but it cannot be made to prove that he founded it.

3. *Though built by Rameses II., the city of Pa-Rameses was strengthened by his successor, Menephthah*, who, in the letter of Amen-em-apt, is thus invoked:—"Oh, sweet is thy voice in speech! It is thou who hast enclosed Pa-Rameses with a wall!"

As we have already seen, Professor Ebers found the remains of a wall of circuit at Tel-el-Maskhoota built with bricks stamped with the cartouche of this Pharaoh.¶

4. *Pa-Rameses was a port.* Now, a port, in the Egyptian acceptation of that word, whether we take it in its ancient or its modern sense, does not necessarily mean a seaport, but merely a place accessible to shipping. Thus the little village of El Hamra is called the "port" of Asyoot, because the Nile-boats moor there; the town being at some little distance from the river. Pa-Rameses was a port because it could be approached by water. In the letter of Panbesa* we accordingly read that

"Its galleys come and go in the port."

And again:—

"Beer of Kati is brought to the port."

Among the papyri of the Leyden Museum is a large collection of scribes' letters containing many allusions to the water-traffic of Pa-Rameses. One Kauiser, writing to his master, tells how he found a boat waiting for him at the port of this city. Another scribe in another letter complains that, when he arrived, he found "no boats at Pa-Rameses."

We have already seen how the canal of Seti I.—that same canal called "The Cutting," which is represented in the bas-relief sculptures at Karnak†—was carried through Wady Tûmilat from "a little above Bubastis" to Lake Timsah, along the very route now followed by the Freshwater Canal and the Ismaïleeyah railway. Hence, the ancient fortress, the walls of which were washed by that canal, was unquestionably a "port."

5. *Pa-Rameses was a port in communication with the Red Sea.*—This is shown by the Letter of Panbesa, who enumerates among the delicacies sold at its daily market:—

"Fish from the river Puharta,"

—the river Puharta being identified by Dr. Birch and Professor Maspero with the Euphrates.

The significance of this allusion is very great indeed; for not one of the other sites which have from time to time been proposed for Pa-Rameses could by any possibility be shown to have a direct shipping trade with the Persian Gulf. But if we admit, with Maspero, Mariette, the Abbé Vigoureux, and other high authorities, that in the time of Rameses II., the ancient canal was already carried as far as the Red Sea, the connection is at once established.

And in truth it is almost impossible that so great a work should not have been completed by either Seti I., who began it (as shown by the Karnak sculptures), or by his son and successor. That the canal was subsequently allowed to become silted up, and then, in later years, was repeatedly cleared out, silted up, and cleared out again, is a matter of history; and that those rulers of Egypt who so cleared it should each arrogate to himself the honour of having "cut" it, is in accordance with the style and custom of the times. Tradition, as handed down in the pages of Strabo, Aristotle, and Pliny, attribute the commencement of the canal to Rameses II.; Herodotus attributes it to Nekau, and says that it was finished by Darius; Strabo and Diodorus say that it was finished by the Ptolemies. Not one of these great writers could speak Egyptian or read a hieroglyphed inscription; and consequently, although they lived so much nearer than ourselves to the time of the Pharaohs, they did not know, as we do, that the De Lesseps of the Middle Empire was Seti I. If their traditions and mutual contradictions have any historical value, it is only in so far as we are enabled to translate them into probable or recently ascertained facts. The reigns of Seti I. and Rameses II. were both unusually long, and the public works executed by these Pharaohs are, with the exception of the Pyramids, the most colossal monuments of ancient Egypt. If, therefore, Seti, the father, did not himself carry the canal of "The Cutting" beyond Lake Timsah, we may, I think, be certain that Rameses, the son, connected the waters of Lake Timsah with the waters of the Red Sea, and so became traditionally credited with the glory of originating a work which, in point of fact, he only completed.

* See Knowledge, Sept. 29, p. 292.
† *Ibid.*, Sept. 29, p. 292.
‡ *Ibid.*, Sept. 29, p. 293.
‖ *Ibid.*, Sept. 8, p. 244.
§ *Ibid.*, Dec. 8, p. 450.
¶ *Ibid.*, Dec. 8, p. 450.

* See Knowledge, Oct. 13, p. 324.
† *Ibid.*, Oct. 27, p. 357.

Nor must one last scrap of contemporary evidence in the oft-quoted letter of Amen-am-apt be left unnoticed. After describing Pa-Rameses as "the beautiful outpost," he goes on to say that it is "the exercise-ground of the cavalry; the parade-ground of the archers; the landing-place of the foreign auxiliaries." It is, of course, conceivable that the auxiliaries might have been brought hither in transport vessels by way of the Nile; but the obvious and straightforward meaning of the phrase would seem to point to a direct water communication with foreign seas.

How far the Pharaonic engineers had to cut their way before they reached the Red Sea is a question upon which the highest modern authorities differ as widely as the Greek and Latin writers differ about the original maker of the canal itself. According to some, the northern limit of the Gulf of Suez, at the time of the Oppression and the Exodus, was very nearly where it is now. According to others, it reached as far as the head of the Bitter Lakes, which then formed part of the gulf. Mr. R. Stuart Poole—an essentially cautious and exact writer—goes so far as to say that it may even have included Lake Ballàh*; in which case, the ancient canal would have been completed as soon as it reached the shores of what is now Lake Timsah. To weigh and compare these diverse views would carry us far beyond the limits of the present inquiry; and the conclusion to be arrived at—if a conclusion could be arrived at upon a point respecting which geologists, engineers, historians, and archæologists disagree—would not in any case affect the issue of our argument. Be the distance longer or shorter from what is now Lake Timsah to what was then the head of the Gulf of Suez, we may take it for granted that the builder of the Hall of Columns at Karnak, or the excavator of the Great Rock-cut Temple at Aboo-Simbel, would have ploughed a water-way through it for his galleys, if he were so minded.

(To be concluded in our next.)

STAYS AND STATUES.

I WAS expecting the promised completion of your statue gallery, or I should have sent you before some observations on Dr. Lewis's interesting letter on American corsetology, in which the facts are much more valuable than the opinions. He, and Englishmen who write like him, are evidently quite ignorant of the real distinction between judicious and injudicious corset-wearing and construction; and so, indeed, are many stay-makers and wearers, as one can see in the shop-windows and the streets. It is true that weak stays or narrow belts which press the stomach downwards are injurious, and they may possibly cause rupture as well as indigestion and other ailments. But doctors who do know the distinction have long ago recommended properly-made stays, for the very reason that they often prevent or cure all those ailments. I have read frequently during the last fifteen years that they ought to be made long enough and worn tight enough to press upwards and not downwards, and that even short stays or belts will do so if a perfectly stiff busk is worn under them, as sundry proficients in tight lacing, both male and female, have testified. That may be seen now to be aimed at in most of the corsets that are advertised in the pictorial papers and with medical recommendations. The opinion of a doctor who does not know this is worth as little as of any writer who thinks he knows better than the wearers whether they are weaker or stronger for their stays.

Now for his facts. I can only say they seem to me more likely to induce our tight-lacers to order smaller stays, than to subscribe half a-crown to the anti-corset society which has raised this discussion. For he tells them that, among American young ladies, a waist of 19 in. is considered "immense"—which is probably only feminine for "rather large"; but here it is considered rather small, and 16 in. very small. And further, that reduction of 10 in. is quite common in America, against 7 in. or 8 in. here; which, as American ladies are certainly not larger than ours naturally, must mean that waists of only 14 in. and less are not uncommon there, while they are very rare indeed here. This doctor's letter only makes me more incredulous than ever of any bad effects from such tight-lacing as is practised here now, except when it is injudiciously performed. And as for "a third of women's diseases coming from it," how do the doctors who write in that loose way account for women living on the average some years longer than men? I have not a word to say against his statements of the good effects of certain exercises; but it is useless to ignore the fact that they never are or will be practised beyond an early age, if at all; and that such exercise as is taken is often not sufficient alone to preserve a good figure and carriage. Some persons who take plenty are nevertheless clumsy in their gait, which is often cured by judicious corset-wearing and neck-straps, which are said to be easier and better than shoulder-straps.

Of your statues, come and coming, I have only to say that few persons require statues to convince them that corsetted waists are smaller and rounder than natural ones, which is all that they can prove on this question. And as the opinion of all civilised nations, since there were any, has always been, and probably always will be, that slender waists look the best and are essential to a good figure, they are quite certain to be cultivated artificially. If some American artist chooses to invest them with imaginary drapery, we outgrew that folly 100 years ago, which came in with one or two fashionable painters in the time of Charles II. I have a picture of an ancestress in a costume of that kind, which no woman upon earth ever wore or could wear and move about in. That is merely falsifying history.

I really do not know what to say consistently with courtesy of your obviously hasty and dashing notes of Dec. 22 upon my letter then. I had better only notice two specimens of what you apparently meant to pass for logic and "science, plainly worded and exactly described." "Waists in such a condition that contraction *to* (of?) 7 in. or 8 in. is found essential to comfort, may be very fairly compared to the disabled feet of the Chinese ladies." First of all, nobody had said that such contraction was "essential to comfort," but many persons had said they found it comfortable; and among them, let me remind you, was the Army surgeon who had reached that conclusion very soon, and found himself the better for generally wearing stays of 23 in., though "unusually wide across the shoulders." If you had reflected for two minutes, you must have seen that comparing that to the notoriously painful and destructive maiming of Chinese feet is ridiculous.

Again, "The consensus of a multitude of people that they find themselves better in stays shows that [stays] do weaken the stomach." I have only shortened your sentence a little, leaving it substantially unaltered. And when it is seen thus naked, who does not perceive its absurdity at once?

I am willing to make due allowance for the well-known necessities of editorial infallibility and smartness in dealing

* See Chap. xviii., p. 120, of R. S. Poole's "Cities of Egypt," a work as delightful in style as it is instructive and interesting in matter.—[A. B. E.]

XUM

with correspondents who dispute the former. But I am inclined to think it has its dangers, and that a little silence is sometimes more prudent. And now I hope to leave this discussion, which has only confirmed my former conclusion, that all the *a priori* arguments on this subject are one way and all the evidence of facts the other. Medical opinions are not facts. AN OBSERVER.

Jan. 6.

[I put off my paper to give place to "An Observer's;" and may, perhaps, omit much which I had written on the artistic aspect of the matter. If he finds no force in the evidence from statues (of all ages) to show that artists see less beauty in corseted waists than in "natural ones" (how *much* he admits here!), argument would be idle; and certainly argument is unnecessary for most men. Even the tight-lacers laugh at each others' ridiculous shapes and ungraceful movements.

My "obviously hasty and dashing note" was written at leisure. I see nothing to alter, except the misprint "to" for "of," and perhaps I might have written "essential to perfect comfort" (more than *mere* comfort was claimed). I aimed only at brevity, not at smartness; and knowing what a master of fence "An Observer" is, I only touched where I might have thrust. It would seem that I overrated his quickness of perception (which I should have thought scarce possible). Even had I written, "A man's feeling better in stays, proves stays to be bad for him," I should have expected that he would have seen where my point lay, though a less skilful "opposite" might miss it.

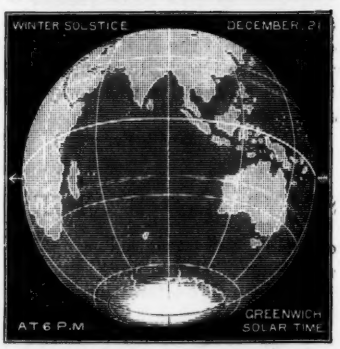
If "An Observer" is fair in charging me with the silly pretence of editorial infallibility, then I must unwittingly have been guilty of what I heartily despise. But I think he is not quite fair,—though I am sure he wishes to be so. A correspondent has said to me: "When you wrote for the *English Mechanic* you seemed to be always in the right; *here* you seem to take pleasure in showing where you have been wrong." Yet there is no real difference. In answering the paradox-mongers and other foolish folk who found, and still find, admission *there*, I had an easy task, though I sickened of it at last, and (after an appeal to have it lightened) gave up the hopeless business. But we want in these columns to get at the truth. I am very much in earnest, I must admit, about this corset question. I believe "An Observer's" views to be mistaken, and most mischievously so,—wondering, moreover, greatly how so keen a reasoner as he is has come to be misled by the arguments of "tailless foxes" against Nature's customary arrangements.—RICHARD A. PROCTOR.]

SUN VIEWS OF THE EARTH;

OR, "THE SEASONS ILLUSTRATED."

BY RICHARD A. PROCTOR.

I GIVE in the accompanying figures four views of the earth at the winter solstice, showing her aspect, as supposed to be seen from the sun on Dec. 21. Strictly speaking, a large tract of the northern hemisphere should have been whitened, to correspond with the extension of the Arctic snows in winter. But as this would have entirely obliterated Great Britain from view in the second figure, showing the earth as she would appear from the sun at noon (London), it seemed better to leave this part of the sun views unchanged. In another figure is given a view of the British Isles as seen foreshortened from the sun in winter time. This may be regarded as a pictorial explanation of the cold of winter in the northern hemisphere in December.



LECTURE NOTES.

BY RICHARD A. PROCTOR.

I HAD every reason to be gratified by the kindly concourse which gathered to hear my lecture on the "Star-Depths," at St. George's Hall, Langham-place, on Sunday, Jan. 7. It was the first lecture I had given there since my return from my long American and Australian tours. I could not but think, as I saw the audience gathering, and remembered the long and successful career of the Sunday Lecture Society—a success chiefly due to the zeal and energy of Mr. W. H. Domville—how confidently Sir Henry Parkes had, in his ignorance, asserted that the law of England, which he claimed to enforce, allowed of no Sunday gatherings to hear lectures on scientific subjects. Here is a society, including on its list of officers the names of the most eminent men of science of the day, which has for years continued the good work of using science on Sundays to instruct and elevate the people,—as Arago long since urged (addressing the French Senate*)—that science should be used.

There are not to be found better audiences anywhere than those which gather at the invitation of the Sunday Lecture Society. They have all the good qualities which audiences can possess. During my lecture last Sunday they showed that they possess qualities which a lecturer does not usually care to tax—to wit, patience and good temper. I have always been more than satisfied with the way in which the lantern has been worked at these lectures; and I had no anxiety, therefore, on that score. But unfortunately it had been deemed well to change the usual arrangement by which the lantern had been worked from behind the screen, showing the views as transparencies. Some unsatisfactory photographs, I suppose, had failed in recent lectures to show well that way. So it was decided to work from the front. The experiment (would that it had been tried with any lecture but mine!) was not a success. The views obstinately failed to focus, and after sundry shiftings of the lantern, the attempt was given up as hopeless. I thought at first there was something wrong with the Society's lantern, or else with the operator, but later I recognised the cause of the trouble in the circumstance that the screen was vertical, while the optical axis of the lantern was inclined some 20 degrees to the horizon. Thus the more delicate views failed to show what they were intended to show, and my lecture had to be modified correspondingly. However, the audience bore this most good-humouredly, and also the pain (as I fear it must have been to many) of a glare of limelight from the back of the instrument. Whatever reasons the Society's lanternist may have had for departing from his customary arrangement, I may assure him, on my own behalf, that on all former occasions I have been well pleased with the working of the instrument. Whenever a change of the kind is proposed it should be rehearsed. If there is one thing more trying to a lecturer than another, it is to find his promised illustrations failing him. But, after all, worse mishaps have befallen me. I shall ever remember the face of woe with which the Rev. Professor Leonard, of Iowa City, announced to me (just as I had told the audience that such and such pictures would be shown) that some one had "let out all the gas!"

Talking of lecture experiences, I may note that *since* Sunday, the strangest I have ever known has occurred to me. I have given, I suppose, some 1,500 lectures, if not 2,000, in the last thirteen years—386 of them in America, 124 in Australasia, but those in Great Britain not counted. I have addressed audiences of almost every possible sort, religious, mercantile, educational, college classes (male and female), schools, members of special religious denominations (from Roman Catholics, as at the Hanover-square Rooms, by special request of Fr. Christy, S.J., at one extremity of the scale, to universalists at the other), besides such bodies as the Royal Institution, the London Institution, the Lowell Institute (24 lectures), the Stephens Institution, and so forth. There have presided at my lectures such men as Wm. Cullen Bryant, the poet, Sir Henry Holland, and Sir Wm. Armstrong, eminent in science, Dr. Goldwin Smith, the Duke of Westminster, the Bishop of Exeter, and many others belonging to the different classes of which these are representative men. And though kindly feeling may often dictate expressions of approval on such occasions, I think it has been said as the simple truth by all of them, that my lectures have tended, as I have wished they should tend, to raise men's thoughts "from Nature up to Nature's God." Be this as it may, it has certainly never yet happened to me to find any person who had *not* heard me lecture, so unmannerly as to suggest the possibility that any lecture of mine might have the reverse influence, might even produce effects antagonistic to moral and social welfare. Even the rough but kindly working-men who have sometimes acted as secretaries for lecture committees, have always had the sense to see that to question a lecturer on this point would be equivalent to asking him if he had common-sense or decent manners, if he would refrain from foul language on the platform, or would come sober to the lecture-room. But I have just received from a neighbourhood, not supposed to be the abode of ill-bred persons only, a request involving precisely such an offence against propriety and common sense.

I had consented to deliver a lecture at Streatham (it happens that it was the very lecture of whose tone Dr. Temple, Bishop of Exeter, spoke three years since in warm and kindly approval). My consent to lecture obtained, a ludicrous thing happens. A churchwarden, beadle, or the like, asks that I be requested to assure the committee that nothing shall, in the course of my lecture, "be advocated, said, or sung (*sic*), antagonistic to the promotion of Evangelical religion, temperance, and the moral and social welfare of the neighbourhood" of Streatham, or "repugnant to the salutary objects of the building" (the Streatham Assembly Room)! Truly the ways of Bumbledom are strange, and the manners of Little Pedlington peculiar.

* I may mention, as an odd coincidence, that this celebrated address was delivered on March 23 (Maunday Thursday), 1837, my first day in this world.

THE TELEGRAPH IN BRITISH GUIANA.—Since the introduction of the sixpenny rate, says the *Colonies and India*, the number of telegraphic messages sent within this colony has increased nearly fourfold.

THE total number of patents controlled by the Gramme Electric Company of New York (says the *Electrician*), was, on the 1st of November last, 389, and included everything relating to electric lighting and the distribution of electricity, as well as some miscellaneous patents.

SOME novel electrical experiments have been carried out lately at the Trafalgar Collieries, Forest of Dean. This has taken the form of using an electric motor to drive a pump in the underground workings. The total vertical lift of the electric pump is 115 ft. The electricity is generated by a dynamo machine at the surface of the colliery, and the wires connecting this with the pump extend down the shaft a distance of 500 yards.

XUM

LOGICAL PUZZLE.

I FEAR you have made some slips in your explanations of the logical puzzle, at p. 7, No. 62.

In the first explanation you say, "for ALL *X*'s to be *Z*'s," &c. "*This can only be true, supposing the X's to be equal in number to the Z's;* but, as we know nothing as to the number of the *X*'s, except that they are at least equal to all the *Z*'s, and may be any greater number, *we can make no assertion whatever with regard to the X's.* Consequently, in the case in which the *X*'s are in excess of the *Z*'s, *to speak of* ALL *X's being Z's is utterly absurd, and has no meaning whatever.*

Your second slip is of more importance, and depends on the application of the word *some*. *Some*, in ordinary language and in logic, *implies one or more, and may signify* ALL. Your second explanation only applies to one of the alternatives—the case in which *some* does not imply *all*. Yet you pass this off as a full explanation of the problem, while in fact *it is only half the explanation.* It can only be taken as the full solution by supposing the word *some*, in certain cases, to imply *none at all*, which is absurd.

You say there are "so many *Z*s which are not *Y*'s, and so many which are *Y*'s." By what process of conversion or transmutation do you extract the first of these propositions from the simple premise, "Some *Y*'s are *Z*'s?" "Some *Z*'s are not *Y*'s" can never be deduced from the premise. It may possibly be true in certain cases, but does not necessarily follow. *It is quite possible that all the Z's may be Y's, and then none of the Z's would be not Y's.* In that case, unless the word *some* signifies *none*—which it certainly does not signify in ordinary language and in logic, whatever it may signify in mathematics—*your explanation is altogether insufficient, and ought to be supplemented by the case in which all Z's are Y's.* To take the concrete example, *the rowing men may* be exceedingly numerous, and *include all the* 1,350 *football players*, and many others.

I consider logic—as the science which teaches how to find truth—to be one of the most important studies.

THOMAS COMMON.

[Our correspondent has afforded us, not intending it, a curiously apt illustration of the way in which formal logic interferes with ready reasoning by taking one off the track to follow side issues. The thing to be shown being that some *X*'s are not *Z*'s, we pointed out how the assumption that all *X*'s are *Z*'s leads at once to a contradiction—this being, in point of fact, precisely the way in which a soundly-reasoning mind deals with the matter: our correspondent objects to this, that we can make no assertion whatever with regard to *all* the *X*'s—confounding assertion with assumption. In using the *argumentum ad absurdum* one always *does* assume what is eventually shown to be absurd, or "utterly absurd," if Mr. Common likes strong adverbs.

As "a more important objection," and as making our explanation "only half an explanation," he notes that we omit all reference to the case in which all *Z*'s are *Y*'s,—of which, if we had thought it worth while to speak at all, we should have noted simply that it requires no explanation. Our correspondent seems not to have noticed that if all *Z*'s are *Y*'s, the syllogism reduces simply to this—

All *Z*'s are *Y*'s;
Some *X*'s are not *Y*'s;
∴ Some *X*'s are not *Z*'s.

Would it have been worth while to point out the truth of this (a common syllogism in *Baroko*) to readers of KNOWLEDGE?

Our correspondent gives further illustration of inexact reasoning by quietly "begging the question" at the close of his letter. If logic is the science which teaches how to find truth it is unquestionably one of the most important studies. But men find truth by observation, experience, and reasoning,—not by logic. Logic is only the science which teaches men what they do when they reason; (even Whately does not claim that the study of logic teaches men how to find truth); and many, after they have learnt logic, pay more attention to the question whether they are reasoning in *Barbara* or *Celarent*, than to the truth of their premisses or the validity of their conclusions.

RICHD. A. PROCTOR.]

"Let Knowledge grow from more to more."—ALFRED TENNYSON.

Letters to the Editor.

Only a small proportion of Letters received can possibly be inserted. Correspondents must not be offended, therefore, should their letters not appear.

All Editorial communications should be addressed to the EDITOR OF KNOWLEDGE; *all Business communications to the* PUBLISHERS, *at the Office, 74, Great Queen-street, W.C.* IF THIS IS NOT ATTENDED TO, DELAYS ARISE FOR WHICH THE EDITOR IS NOT RESPONSIBLE.

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The Editor is not responsible for the opinions of correspondents.

NO COMMUNICATIONS ARE ANSWERED BY POST, EVEN THOUGH STAMPED AND DIRECTED ENVELOPE BE ENCLOSED.

SINGULAR PHENOMENON.

[683]—In 1881 I tried, late in the year, marking a tennis court with tape. This remained on the ground only one day. My surprise was great in November to see the court marked out one frosty morning, as though the hoar-frost had been brushed from off the lines where the tape had been. In spite of it never having been used again, I still, with the return of winter, see my court marked every morning as before. If you or any of your readers would give me a satisfactory explanation of this, I should be much obliged.

E. SKINNER.

SHIPS IN A CALM.

[684]—In answer to the question relating to the onward motion of a ship in a calm, I beg to give the following explanation:—

If a wooden sphere or hemisphere be dropped from any height into water, it will sink and rise alternately until it comes to rest on the surface at the exact spot in which it first struck the water. This is because the resistance its surface offers to the water is equal in all directions. If, however, the form be altered to that of a ship, it will not be found to remain in the same spot after repeated oscillations, because the bottom offers more resistance at one end than the other; and, of course, the ship moves in the direction of the less resistance. Now a ship on the sea is constantly being raised and allowed to fall again into the sea from a "swell" which exists even in calm seas. Thus a ship is always oscillating up and down, at one time a little more out of water than it would be if the mass of water were perfectly still, and at another time a little deeper in than it would be under the above-mentioned circumstances. This up and down motion of the sea is always acting; but when the surface is rough, this action on the motion of the ship is infinitesimal, compared with that due to the action of the wind, and so is not noticed; but when there is a calm, there is no other force at work, and, therefore, that is the only one noticed.

JAMES SHUTER.

THE RAINBAND.—A NEW ZEALAND GUM.

[685]—I thank you and Mr. Bramley-Moore for the "Rainband" information (page 485). May I ask you to insert in future numbers correspondence on the subject of the Rainband? Perhaps some one would give a table for—say a month—of daily weather, with spec-

troscopic values for each day; this would be likely to help and encourage other observers.

Another question I wish to ask is, can you or any of your readers give me information respecting a fossil gum found in New Zealand, and called there "Kawrie." A cousin of mine just returned from New Zealand tells me it is dug up from 6 in. to 20 ft. below the surface (in the North Island). It varies in colour to from nearly a pure crystal to beeswax. I have had some dissolved in chloroform and ether, to use in mounting microscopical objects; it is quite as clear as Canada balsam. Some of the wood (the tree still grows, I believe, only in the North Island) I have examined in thin sections under the microscope. It shows the peculiar glandular discs of the conifers, but in an arrangement I do not remember seeing before in such woods. JOSEPH CLARK.

EARTHQUAKES IN WESTMORELAND.

[686]—A smart shock of earthquake was felt in Westmoreland in 1835, which has not been referred to in your notices of Earthquakes in the British Isles, and as I still retain a very vivid impression of it, I venture to offer the following particulars. It occurred about the middle of August. I was on a visit at a friend's house. The night had been so excessively sultry it was almost impossible to sleep, and soon after sun-rise I was startled by a loud, rattling, and rumbling noise, which at the moment I thought was occasioned by a team of horses running away with a heavy waggon over a rough road. Immediately afterwards the glass and earthenware in the room were violently shaken, and I distinctly recollect the lateral motion was so strong that, lying on the edge of the bed on account of the heat, I was very nearly thrown on the floor. On looking out of the window, the cattle in the park were seen rushing wildly about with signs of great terror. I do not remember whether any buildings were injured, but the arch of a small bridge was displaced and partly inverted. I think there was only one shock, and it seemed to come from the south-west.

Dec. 18, 1882. MATTHEW BELL.

LONGEVITY OF THE DOVE.

[687]—A Turtle Dove* died at East Keal, 24th October, 1882, aged 45 years. The bird was given to the son of one of his tenants at Crowland by a gentleman still living at Bedford, in the year 1852, having been in his possession 15 years. Since then it has lived without a mate 8 years at Crowland, 20 years at Aswardby, and 2 years at Keal. I have known it myself during the last 20 years of its life, and believe the above facts can be authenticated.

Horncastle, Oct. 28, 1882. C. J. CASWELL.

Answers to Correspondents.

S. N. N. (1) notes that, like our correspondent in No. 55, he often, when tired, writes "b" for "p," "d" for "t," "v" for "f," confusing no other letters. 2. Italian.—H. B. HEATH. You are right and wrong. The sign ♈ is for the *Sign* of the Ram; but owing to precession the sign and the constellation no longer agree. The sign Aries is now in Pisces.—TARANAKI. (1) Please describe your mechanical method for trisecting an angle. (2) It would be impossible to explain the instrument without seeing it.—W. C. P. (M.A. Oxon.) Many thanks for suggestions, which I carefully note.—R. C. N. Many thanks. But readers object to more space being given to Mr. Siemens' theory; and as you evidently recognise its insufficiency, no adequate purpose would be fulfilled by printing your paper maintaining that some of the objections are not valid. But first, in reply to your question, Why should the substances compounded with evolution of light and heat as they approach the sun, fall on his surface, as M. Hirn suggests? I would ask, *Where* is the light evolved? Is it not at the surface? Secondly, if the interstellar air is thinned to the degree you mention, it is hopelessly inadequate to do what either Mr. Siemens or Mr. Williams wants. (Compared with air's, its density you give as a fraction having a single digit in its numerator, and 350 digits in its denominator.) Thirdly, to calculate the effect of solar globe rotating in a space universally pervaded by an atmosphere, is not quite so simple as some seem to imagine. The outer parts of the rotating body merging into that atmosphere, we should want to know the amount of frictional resistance, and to remember that while the frictional action of air on air gives the centrifugal tendency, the motion (thus produced) of air in air would presumably be frictionally resisted too. If the sun were not himself moving in space, a steady current might, perhaps, after a while, be produced; but how far it would extend is another matter. The sun, however, is not at rest, and this brings us to another very serious difficulty: if such effects as Mr. Siemens' theory requires are produced by the motion of the exterior parts of the sun's equator at the rate of, say, 100,000 miles a day, what would be the effect of the sun's motion of translation at the rate of more than 400,000 miles a day—supposing Otto Struve's estimate not to fall short (as I believe it does in enormous degree) of the true velocity.—G. T. RYVES. (1) Sir J. Herschel's "Lectures and Essays," published by Strahan, and, I think, also by Routledge. (2) Pardon me; you were not told that the comet would return in six or seven months, but that if a certain observation telegraphed from the Vienna Observatory were trustworthy, that would happen. The observation was incorrect. It misled others besides me. Theoretically, three observations of a comet fix its orbit; but unfortunately the nucleus is neither a circular disc nor a point; hence the real position of whatever point is the true centre of the comet's mass is not readily determined. A very slight error on this point would make a wide difference in our estimate of the comet's orbit, from three, or even from a dozen, observations. Sad, indeed, if "public confidence in the calculations of astronomers should be shaken for a long time to come." If astronomers made comets to order, their failure to make them with nice-shaped nuclei would be blameworthy. But they don't. I rather fancy my own error was due to a careless telegraphist than to the observers at Vienna. (3.) Many talked about Swift's moons of Mars at the time when the real moons were discovered. The idea was probably Arbuthnot's, as Swift would not have worked in Kepler's Laws. But the suggestion that Mars should have two moons is much older. It was first thrown out by Kepler in a letter to Galileo on the discovery of the four moons of Jupiter. Kepler, also, was the first to throw out the idea that planets invisible to the naked eye travel between Mars and Jupiter.—C. J. BROWN. Mr. Dallinger's article puts it well, you think: well, as it claims infinity of excellence, it could hardly go much farther. He sees no "raggedness and inferiority" in *those* Eastern books. When, glancing over his columns, I supposed he was speaking of *all* such books, I thought he put the matter pretty fairly. Only I thought he omitted to make adequate reference to certain iniquities. The system on which Caliph Haroun al Raschid distributed justice may be very attractive to Eastern minds; but neither his plan of apportioning punishment to the innocent (as the members of an offender's family), nor his way of condoning offences, accords with Western ideas of justice, or even of morality. Some may, perhaps, find in this injustice, multiplied by infinity, something infinitely adorable: I cannot. I can imagine men crouching in terror before such a power, but not revering it. Mr. Dallinger seems quite to misunderstand the agnosticism of modern science. It *does* agree with the saying of old, "As touching the Almighty, we cannot find Him out;" but while it may, nay must, be in darkness as to what the Almighty *is*, it entertains no manner of doubt as to what He is *not*. You may rest well assured that with whatever zeal and warmth believers in any special dogma denounce scientific teachings which they may regard as inconsistent with it, the student of the Laws of Nature rejects with at least equal earnestness the doctrine that the God of Nature is the Brobdingnagian Bashaw imagined by Eastern, and idolised by many Western, minds. Here Sense and Science alike are on sure ground. The existence of evil, the sufferings of the innocent (men and brutes alike), and other such troubles, may perplex and puzzle science, as of old they perplexed Job and his friends: but they will never lead Science to accept Infinite Iniquity as Deity, any more than they led Job to "Curse God and die."

ELECTRICAL.

G. F. 1. If a continuous wire be wound so as to have a right-handed helix on one end of the bar, and a left-handed on the other, the passage of a current will develop similar poles at the two extremities, and the inner ends of the two coils will conspire to make a strong pole in the centre, because a current *leaving a right-handed helix* has the same inductive effect as it would have on *entering a left-handed helix*. (2) No. If two unequal positive currents attempt to enter a wire at its opposite extremities, the only current that will show itself will be the difference between them. If they are equal, neutrality results. If they are opposite, they conjointly produce a greater effect than would either current by itself. In the latter instance, however, the two opposite currents in opposite directions should be regarded as the same current flowing in one direction. (3) The original armature already described in "Amateur Electrician." The present modified form adopted for large dynamos consists of a long cylindrical drum, on which are wound several independent coils of wire attached to the commutator similarly to the Gramme.

* A small terra-cotta-coloured bird with a black ring round the back of the neck.

XUM

Our Paradox Corner.

A THEORY OF MERCURY.

By Thomas Foster.

(*Continued from page* 12.)

IT was with a sense of pleasure in the promise of future less restricted play of fancy among men of science, that I heard how a fellow of the Royal Astronomical Society, Mr. John Brett—also known as an eminent landscape-painter—had boldly advanced the theory that the planet Venus, next neighbour to the planet I am now dealing with myself, is quite unlike the earth. According to this theory, the planet which at this time is, I think, adorning our morning skies (Mr. Proctor will confirm this, I believe), has a polished metallic surface, enclosed within a crystalline or vitreous envelope. This pretty planet, indeed, seems to be like those mirror-globes which one sometimes sees in shop windows, wherein you may see distorted images of yourself, of the people walking past the window, of the opposite side of the street, and so forth. I am not sure whether this theory may not in reality have been entertained in very remote times. The ancients certainly knew a number of matters the discovery of which we are too apt to attribute to modern times. I have seen it stated—nay, proved, if the writer who made the statement can be trusted—that the ancient Assyrian astronomers knew all about the rings of Saturn, the four moons of Jupiter, and other astronomical wonders which only the telescope could have revealed to them. Now it certainly is a strange circumstance, in the light of Mr. Brett's attractive theory, that the ancients should have associated the mirror with the planet Venus. In the very same plate, in fact, in which (in his "Saturn and its System") Mr. R. A. Proctor shows an Assyrian picture of Saturn inside a ring, there is shown, also, a figure of the Assyrian Venus, Mylitta, holding in her hand what is manifestly intended to represent a mirror. And the mirror is a round one—no doubt, to represent a globe mirror. The race of astronomers who either found out, or (if Professor Piazzi Smyth is right) had revealed to them, astronomical facts regarded as the special glory of our own time, the astronomers, or priests, who knew of the rings of Saturn and the moons of Jupiter, might well have anticipated Mr. Brett in discovering that Venus is a mirror-globe.

I am aware that some astronomers have attempted to ridicule this ingenious theory. They seem in the first place to assume that because Mr. Brett is a most skilful painter, therefore he cannot possibly be an able astronomer—"he paints like an angel," they say (though I am not aware that either the painting or the writing of angels has yet been made the subject of scientific observation), but he "speaks" (about astronomy) "like poor poll,"* an assumption manifestly unjust in the extreme.

However, to my theory. It relates to the planet Mercury. Mr. Brett has told us all we could expect to know (and more) about one inferior planet; let me endeavour to do the like for another—leaving some one else to tell us all about Vulcan.

When Mercury was last in transit, Professor Langley (of the Alleghany Observatory, I believe) made a curious observation. He had found, in looking at the seemingly blackest part of sun-spots, that a brilliant purple light is emitted, which, as seen through the small pinhole he had left in the field of view, shone with all the lustre of a purple star. This same method he applied to the apparently black disc of Mercury in transit. Precisely the same effect was produced. Obviously, then, the night side of Mercury, instead of being black, glows with a purple lustre. How is this? Do we know of anything akin to this strange phenomenon—of an unilluminated surface, not intensely heated, shining with a purple light? We do. The substance called "luminous paint" produces just such an effect. Sulphide of calcium has been known ever since 1768 (when Canton prepared it by heating a mixture of one part of sulphur with three parts of calcined oyster-shells) to be self-luminous for hours after it has been exposed to light. The bones of cuttlefish and other substances will do. Electrical discharges also will increase the brightness of this self-light.

My theory, then, simply is that Mercury was once covered by oceans, which have since—much like the moon's oceans—been withdrawn into the interior, leaving a stratum of sea-shells, cuttle-fish bones, &c., &c. Sulphurous emanations from the interior, and electrical action exerted by the sun, supply all the rest that the theory requires. Mercury is permanently coated with luminous paint, naturally formed. The intense light of the sun by day causes this luminous paint to glow with strong purple lustre all through the night. Hence the brilliant purple star seen by Professor Langley, when he examined the night side of Mercury through a minute pinhole.

Strange thoughts are suggested as to the past of a planet thus seen to be strewn with the *débris* of former marine life, in exceeding wealth and in multitudinous forms. Strange——

[Very strange, no doubt; but we must omit the rest of Mr. Foster's rhapsodies until he has shown that Professor Langley's blue-purple star was not the light of our own sky. That light was certainly shining through the pinhole. Might it not have looked blue-purple, like the light of the sky when seen from lofty mountain-tops? But *possibly* Mr. Foster is jesting.—Ed.]

* I would submit to the notice of the curious in such matters (and especially to the consideration of some ingenious persons who, a year or two ago, sought to show that the words "batten on this Moor," indicate the Ethiopic Moorish complexion of Hamlet's objectionable uncle), the extreme probability—I would almost say the certainty—that this saying of Johnson's has been entirely altered from its original form. Badly as Goldsmith figured in conversation, it could hardly be said that he spoke like a parrot. But if we remember that Johnson was a University man, and that Goldsmith himself ought to have taken a University degree, the actual expression employed by Johnson can easily be recognised. I suggest, then, that he did not say of Goldsmith, "He writes like an angel, and speaks like poor poll," but, "he writes like an angel and speaks like a 'poll' man," that is, like one who has taken a poll degree. His courtesy led Johnson to overlook for the moment the fact that Goldsmith had taken no degree at all; or else he took it for granted that if Goldsmith *had* taken a degree, it would have been only among the poll men. For these, Johnson probably felt a wholly unwarranted contempt, and Goldsmith's unsatisfactory verbal utterances would seem to Johnson to correspond with what might be expected from poll men. Besides, the contrast between an angel and a man (of any sort) is natural and proper, whereas that between an angel and a parrot is forced, and even to some degree irreverent. Johnson's careful avoidance of all that savoured of irreverence is well known. This, by the way, if my theory is true, is the earliest instance on record of the use of the term "poll man."

Our Mathematical Column.

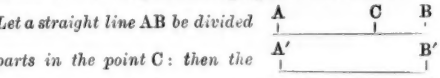
NOTES ON EUCLID.—II.

(*Continued from p.* 15.)

THE Second Book of Euclid affords a good illustration of what might be done in the way of simplifying Euclid, while retaining his arrangement of propositions, and scarcely departing from his method. Thus this book might be presented as follows:—

Prop. I.—Enunciation and proof as in Euclid,—only, in a simplified Euclid, the *statement* which now heads the demonstration can be given as the *enunciation*, as in the props. which follow.

Prop. II.—*Let a straight line* AB *be divided into any two parts in the point* C: *then the rectangle* AB, BC, *together with the rectangle* AB, AC, *shall be equal to the square on* AB.

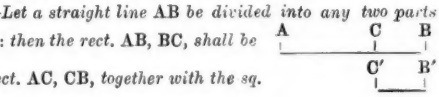


Let A′B′ be equal to AB. Then by Prop. I.,

Rect. AC, A′B′ + rect. BC, A′B′ = rect. AB, A′B′;

that is, rect. AC, AB + rect. BC, AB = sq. on AB.

Prop. III.—*Let a straight line* AB *be divided into any two parts in the point* C: *then the rect.* AB, BC, *shall be equal to the rect.* AC, CB, *together with the sq. on* BC.

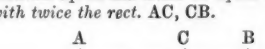


Let C′B′ be equal to BC. Then by Prop. I.,

Rect. AB, B′C′ = rect. AC, C′B′ + rect. BC, B′C′;

that is, rect. AB, BC = rect. AC, CB + sq. on BC.

Prop. IV.—*Let the straight line*, AB, *be divided into any two parts in* C: *then the sq. on* AB *shall be equal to the squares on* AC, CB, *together with twice the rect.* AC, CB.



By Prop. II., Rect. AC, CB + sq. on AC = rect. AB, AC,

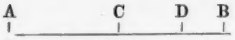
Rect. AC, CB + sq. on BC = rect. AB, BC,

∴ 2 Rect. AC, CB + sqs. on AC, BC = rect. AB, AC + rect. AB, BC,

= sq. on AB (by Prop. II.).

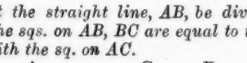
Cor.—If AB is bisected in C, the sq. on AB is equal to four times the sq. on AC.

Prop. V.—*Let the straight line*, AB, *be divided into two equal parts in* C, *and into two unequal parts in* D: *then the rectangle*, AD, DB, *together with the sq. on* CD, *shall be equal to the sq. on* CB.



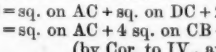
By IV.
Sq. on CB = sq. on CD + sq. on DB + rect. CD, DB + rect CD, DB
= sq. on CD + rect. CB, DB + rect. CD, DB (by III)
= sq. on CD + rect. AC, DB + rect. CD, DB (∵ CB = AC)
= sq. on CD + rect. AD, DB (by I)

PROP. VI.—*Let the straight line AB be bisected in C and produced to D: then the rectangle AD, DB, together with the sq. on CB, shall be equal to the sq. on CD.*



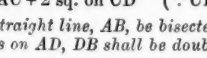
By IV.
Sq. on CD = sq. on CB + sq. on BD + rect. CB, BD + rect. CB, BD
= sq. on CB + rect. CD, BD + rect. CB, BD
= sq. on CB + rect. AD, DB (by I, ∵ CB = AC).

PROP. VII.—*Let the straight line, AB, be divided into any two parts in C: then the sqs. on AB, BC are equal to twice the rectangle AB, BC, together with the sq. on AC.*



By IV. Sq. on AB = sq. on AC + sq on BC + 2 rect. AC, CB
∴ sqs. on AB, BC = sq. on AC + 2 sq. on BC + 2 rect. AC, CB
= sq. on AC + 2 rect. AB, BC (by III.).

PROP. VIII.—*Let the straight line, AB, be divided into any two parts in C, and produced to D, so that BD = BC, then shall the sq. on AD be equal to four times the rect. AB, BC, together with the sq. on AC.*

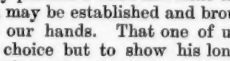


By IV., sq. on AD = sq. on AC + sq. on DC + 2 rect. AC, CD
= sq. on AC + 4 sq. on CB + 4 rect. AC, CB
(by Cor. to IV., and I.)
= sq. on AC + 4 rect. AB, BC (by III.).

PROP. IX.—*Let the straight line, AB, be divided into two equal parts in C, and into two unequal parts in D: then the sqs. on AD, DB, are together double the sqs. on AC, CD.*

By IV., sq. on AD = sq. on AC + sq. on CD + 2 rect. AC, CD; ∴
sqs. on AD, BD = sq. on AC + sq. on CD + 2 rect. CB, CD + sq. on DB
= sq. on AC + sq. on CD + sq. on CB + sq. on CD (by VII.)
= 2 sq. on AC + 2 sq. on CD (∵ CB = AC)

PROP. X.—*Let the straight line, AB, be bisected in C, and produced to D: then the squares on AD, DB shall be double of the squares on AC, CD.*



By IV. sq. on AD = sq. on AC + sq. on CD + 2 rec. AC, CD; ∴
sqs. on AD, BD = sq. on AC + sq. on CD + 2 rect. CB, CD + sq. on BD
= sq. on AC + sq. on CD + sq. on CB + sq. on CD (by VII.)
= 2 sq. on AC + 2 sq. on CD (∵ CB = AC).

(To be continued.)

Our Whist Column.

By "Five of Clubs."

WHEN we consider the conduct of the hand, as a whole, we recognise the object of the various leads and returns and continuations of the opened suit; and we see how much those partners usually gain who play a combined game, and how much is lost in the long run by those who seek only to play their own hand.

Thus, between my partner's hand and mine there is probably one suit, at least, which may be established and brought in, with proper care in the play of our hands. That one of us who has the first lead has usually no choice but to show his long suit, whether it is weak or not. The other, when his time to lead arrives, must decide whether he will show his own suit or adopt his partner's. By showing his own he usually does what the first leader had not done—he indicates a certain degree of strength. By returning his partner's, he says, "I have no suit strong enough to justify me in showing it; probably the adversaries have more strength in it than you and I have; let us combine to establish and bring in your suit if we can." The player who returns his partner's suit in this way, before showing his own, should bear this in mind; for his partner's play will undoubtedly be guided by this supposed evidence of weakness in other suits.

It is for this reason, also, that the first discard is so carefully to be attended to. It helps to show your partner where your strength lies, by indicating where you are weakest,—in the case we are dealing with at present (that strength in trumps has not been declared on either side), and also if strength has been declared in your favour. If your partner has shown his strong suit, and one of the enemies his, your declaration of your weakest suit may not necessarily show your partner in what suit you are strong; for your weakest suit may be his, or that of the adversary who has already declared his strength; your longest suit (your strength if you have a strong suit) may lie either in the third plain suit, or in trumps. But he learns, at any rate, that you are weak in one suit, and is saved from the bad effects which would have arisen had he looked for strength from you in that suit.

Every indication on the part of the enemy must be carefully watched, to show where strength lies and where weakness.

In the early progress of the play, indications may be afforded either on the one hand of sufficient strength in trumps, with a strong suit between you and your partner, to enable you at once to take a commanding position, or, on the other hand, of such broken forces that the best chance you have is to pick up whatever tricks may come in your way, without any thought of establishing a suit, and scarcely a hope of preventing the adversaries from doing so. Of the former case we do not speak now, because it will be considered fully in our chapter on Leading Trumps. In the latter case play carefully to the score, finessing where it seems the only way to save the game, but refraining from even the most promising finesse where a single trick saves the game. Ruff at every opportunity if so weak in trumps that you cannot hope to disarm the enemy; but, if you have three or four small trumps and your partner early shows extreme weakness, you sometimes do well to keep your trumps to draw two for one, when you get the chance.

But, in ordinary cases, play a steadfast game, neither too boldly aiming at a great game with moderate force, nor too anxiously playing to save the game when, with care, you may maintain an equal fight.

It is to gain full command of your own suit that you play the lowest of a long head-sequence, so that, if partner has the winning card, he may play it. The same principle holds as the suit is continued, and applies to shorter sequences. Thus, suppose that after at least one round of a suit you hold second and third best and one or more small ones, your partner having only two, one of which may be the best; if you play the second best, you draw the best from the enemy; but if your partner holds the best, he would not put it on your second best. Even if he knows you to hold the third best, he would infer from your playing the highest that you wished him to leave the trick to you. In fact, if he knew you to hold both second and third best, he would be apt to regard the lead of second best under the circumstances as involving a request to pass the trick. But the third round falling to him, you cannot have your suit returned to you. Therefore, in such a case you should play the third best, which your partner will take, and returning the small one, leave you free to continue the suit. When trumps are out, and your suit otherwise established (that is your partner's King-card only against you), neglect of this precaution is ruinous. In like manner you must constantly be on the watch to get rid of a winning card in your partner's suit which would be apt to obstruct it. The game in our last number affords a good illustration of this point. If attention had not been paid to this rule, the game would not have been won.

(To be continued.)

Our Chess Column.

By Mephisto.

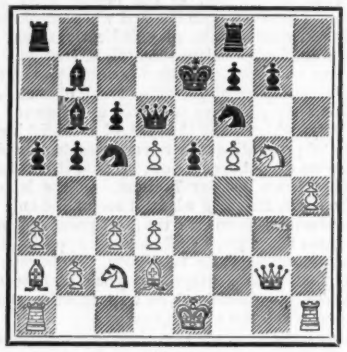
CHESS is never more attractive than when it is played with ingenuity. It is the originality of chess which charms and attracts devotees to our noble game. Soundness in play ought, of course, to be allied to ingenuity, but we hold that the latter quality ought to predominate. The mission of chess is to amuse, therefore it logically follows that ingenuity (which amuses) ought to be primarily cultivated. Chess does not differ in this respect from music and other arts, in which the great desideratum is to combine truth (soundness) with beauty (ingenuity). A successful combination of these two principles must necessarily result in the highest standard of excellence being attained. Unfortunately, however, we have many adherents to each principle by itself, but only very few who combine both qualities in a very high degree. We have Wagner and Verdi, Steinitz and Blackburne. But we have also had (though very seldom) a Handel, who combines in his works the perfected principles of both Wagner and Verdi. We likewise can refer to Morphy, whose play is a glorious combination of the different styles of Steinitz and Blackburne.

Steinitz, during his tour in the United States, played a match with Martinez, a Philadelphian player, and the former won every

game. This result we ascribe not only to the sound play of Steinitz, but also in a great measure to the want of ingenuity of his opponent. We can best illustrate our meaning by giving our readers an instance (of several that occurred) where the result might have been different had more ingenuity been employed.

The following position occurred in the fifth game, after White's twenty-second move, and it admits of highly interesting play, by which Black might have won instead of White, as occurred in actual play :—

Martinez.
Black.



White.
Steinitz.

In this position Martinez (Black) might have won by

	22. Kt takes P (ch)
23. K to K2 (best)	23. P to B4 !

Black now leaves his Knight *en prise*, but White cannot take it without losing the game. If White does not take the Knight, Black's superiority of position is manifest. In case he takes the piece, the following would result :—

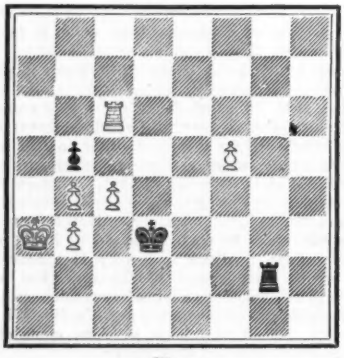
24. K takes Kt 24. Kt takes QP

and wins, for he threatens a terrible triple discovered check by Kt to B5, with the Knight and Queen on the King, and with the Knight and Bishop on the Queen and Rook, which must be fatal, as the following analysis will show :—

	(*a*)	(*b*)	(*c*)
25.	Kt to K4	Q to R2	B takes Kt (best)
	Kt to B5 (ch)	Kt to B5 (ch)	B takes B
26.	K to K3	K to K3	Q to R2
	Q to Q6 (ch)	Q to Q6 (ch)	B takes R (ch)
	and wins the	K to B2	K to K2
	Queen	Q tks B (ch) &c.	Q R to Q sq. and wins.

As a strong contrast to the above example, we give an instance of ingenuity in despair. In the following position of a game which occurred at Pursell's, it can be seen at a glance that Black has a lost game ; nevertheless, with the courage of despair, he conceived an ingenious idea, and succeeded in drawing the game. In our first position White's sounder play won through want of sufficient ingenuity on the part of his opponent. In the present instance the reverse took place ; ingenuity succeeded against insufficient soundness :—

Maczuski.
Black.



White.
Amateur.

The game continued with

P takes P (ch) (*a*)	K to B7
	K to Kt8

(*a*) White's move is unsound, R to KR6 was the right move to win.

Black now threatens mate by R to R7. To avoid this, White was compelled to play R to B sq. (ch) and on K takes R to make room for his King by P to Kt6, after which Black might proceed with

	R to Kt sq.	K to R7	R takes P
K to R4	K to B7	P to Kt7	R to B sq.
P to Kt5	R to QKt sq.	P to Kt6	K to B4
K to R5	K takes P	P Queens	R takes Q
K to R6	K to B5	K takes R	K takes P
P to B6	R to KB sq.	drawn game.	

Another interesting specimen of ingenuity has been put at our disposal by Mr. F. E. Lamb, of the North London Club. The following analysis proves that odds givers need be careful what they are about. It establishes the fact that on receipt of the Pawn and eight moves, a mate can be forced, on the twelfth move at the latest, in a highly interesting manner, and without infringing the rule of not advancing over the middle line of the board.

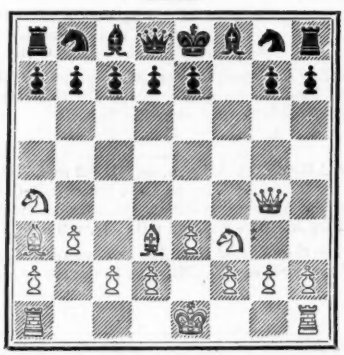
Remove Black's King's Bishop's Pawn.

The first eight moves which bring about a forced mate in four more moves are :—

1. P to QKt3 2. B to R3 3. Kt to QB3 4. Kt to R4
5. P to K3 6. Q to Kt4 7. B to Q3 8. KKt to B3.

Position after White's eighth move :—

Black.



White.

White now threatens mate by B to Kt6 (ch). To avoid this Black can only attempt three moves, all of which end fatally, *i.e.* :

8.	P to Q3, or	KKt to R3, or	K to B2
	B to Kt6 (ch)	Q to Kt6 (ch)	Kt to K5 (ch)
9.	P takes B	P takes Q	K to K sq. (best)
	Q takes P (ch)	B takes P (ch)	Q to Kt6 (ch)
10.	K to Q2	Kt to B2	P takes Q
	Kt to K5 (ch)	Kt to K5	B takes P
11.	P takes Kt	Anything	Mate
	Kt to B5	B takes Kt	
12.	Mate	Mate	

ANSWERS TO CORRESPONDENTS.

*** *Please address Chess Editor.*

Brice Bennett.—White is a piece minus, and, considering the position in general, we do not see how he can avoid defeat.

Francis C. Collins.—Problem will be welcome ; on other subject I cannot express any opinion.

A Cyril Pearson.—Best thanks for problem and report ; you have not sent solution. You are right, in Problem 67 the White Pawn on KR4 is impossible.

John Simpson.—Many thanks for problem ; solutions correct.

J. A. Miles.—Thanks ; will be examined.

W. Collins.—Openings have been objected to, as being text-book information ; in case of a more general desire being expressed, we might resume the compilations of openings.

Correct solutions received :—Problem No. 66, 'John Lonsdale, R. J. P. No. 67, C. H. Brockelbank, H. V. T., W. No. 68 and 69. W., H. V. T., C. H. Brockelbank, Berrow, Kit, S. Bassan Lello, John Watson, R. J. P., John Lonsdale.

XUM